

Universal patterns of voting behavior

Marija Mitrović, Arnab Chatterjee,
Santo Fortunato

Aalto University, Espoo, Finland

Universality in social phenomena

- Human societies are characterized by global regularities. Transition from disorder to order: spontaneous emergence of languages or cultures, consensus about specific topic.
- Identification of features that are **universal** across systems or phenomena \Rightarrow understanding the nature and origin of regularities.

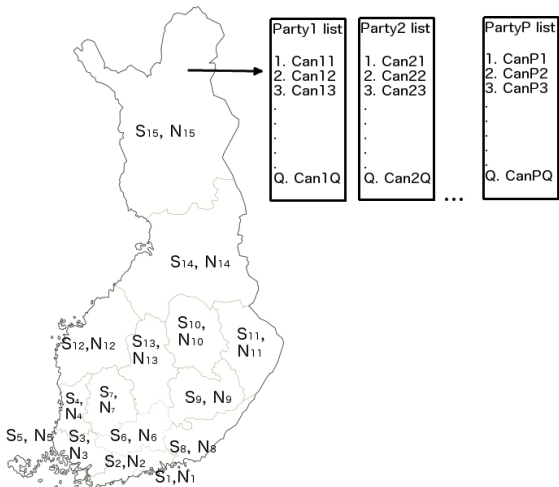
Universality in social phenomena

- **Human societies are characterized by global regularities.** Transition from disorder to order: spontaneous emergence of languages or cultures, consensus about specific topic.
- Identification of features that are **universal** across systems or phenomena \Rightarrow understanding the nature and origin of regularities.

Proportional elections



Proportional elections

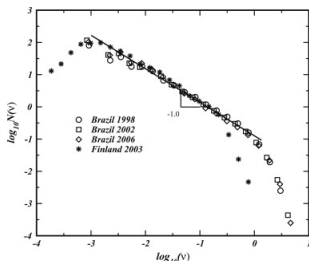


Open and semi-open lists system

- **Open-lists** \Rightarrow order of candidates **on party list** depends on the number of received votes.
- **Semi-open lists** \Rightarrow Candidates are elected in the order they appear on the list. Voters have some influence over who is elected: $v_i > v_{tr} \Rightarrow v_i$ is elected.

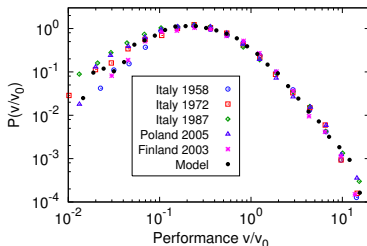
Analysis of votes received by candidate

Fraction of votes - v/N_D



Araripe et al., *Physica A* 388(19), 4167-4170 (2009)

Candidate performance - v/v_0

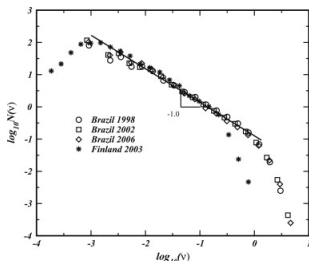


S. Fortunato et al., *Phys. Rev. Lett.* 99, 138701 (2007)

Analysis of votes received by candidate

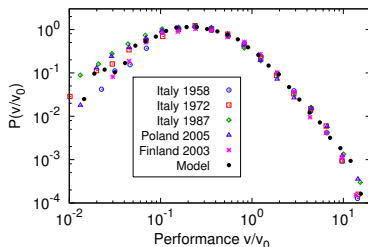
Fraction of votes - v/N_D

Universality: different years and **maybe** different countries.



Araripe et al., *Physica A* 388(19), 4167-4170 (2009)

Candidate performance - v/v_0

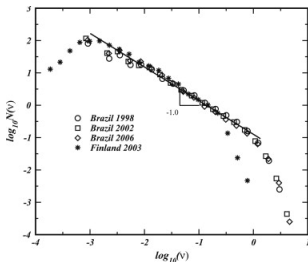


S. Fortunato et al., *Phys. Rev. Lett.* 99, 138701 (2007)

Analysis of votes received by candidate

Fraction of votes - v/N_D

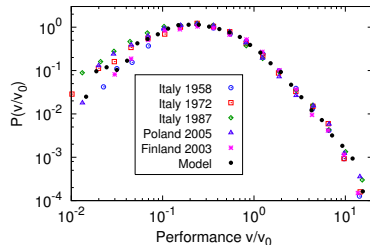
Universality: different years and *maybe* different countries.



Araripe et al., *Physica A* 388(19), 4167-4170 (2009)

Candidate performance - v/v_0

Universality: different countries and different years.



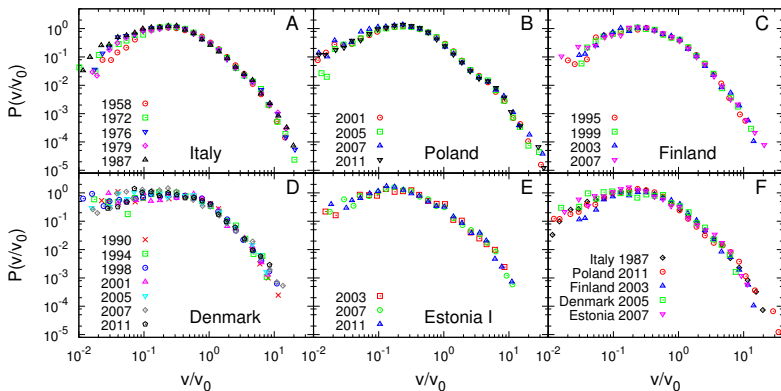
S. Fortunato et al., *Phys. Rev. Lett.* 99, 138701 (2007)

Questions

- **Which measure:** fraction of votes (v/N_D) or candidate performance v/v_0 ?
- **Universal scaling:** for which countries, when to expect.
- Data for elections held in different years in 15 countries with **open** and **semi-open** list systems

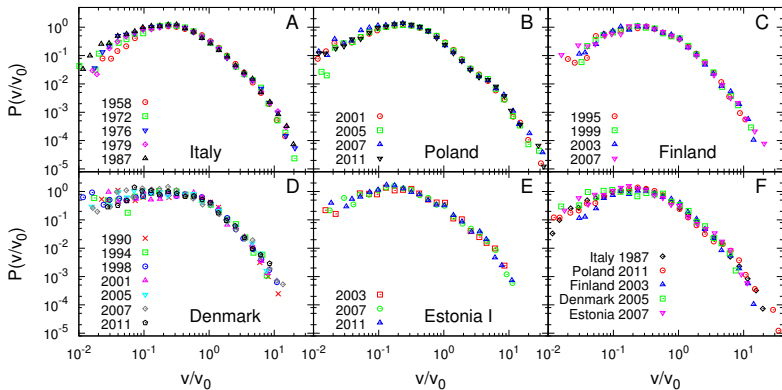
Open lists I: candidate performance

All 5 countries have the same rules.



Open lists I: candidate performance

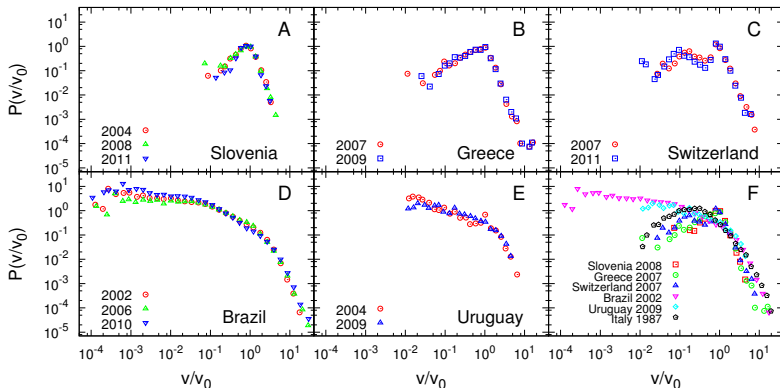
All 5 countries have the same rules.



Universal curve $P(v/v_0)$ within and among nations

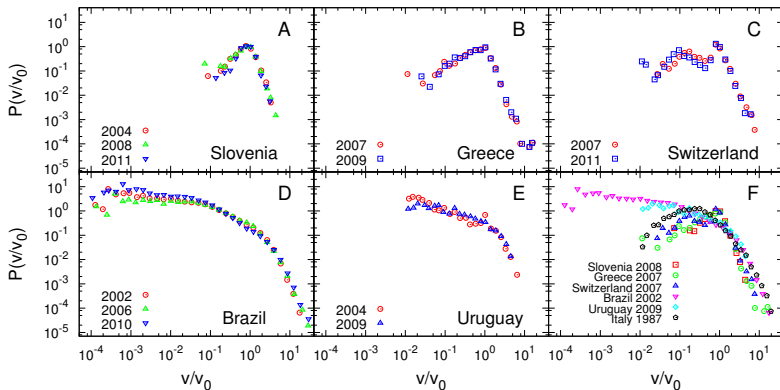
Open lists II: candidate performance

Ranking of candidates depends on v and other factors.



Open lists II: candidate performance

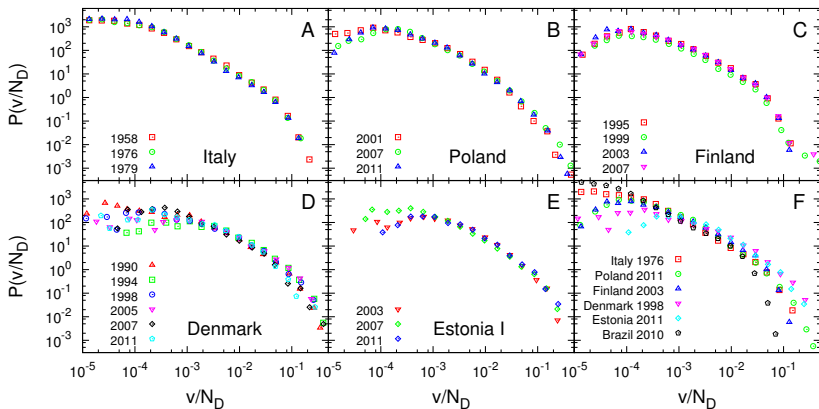
Ranking of candidates depends on v and other factors.



Universal curve for country.

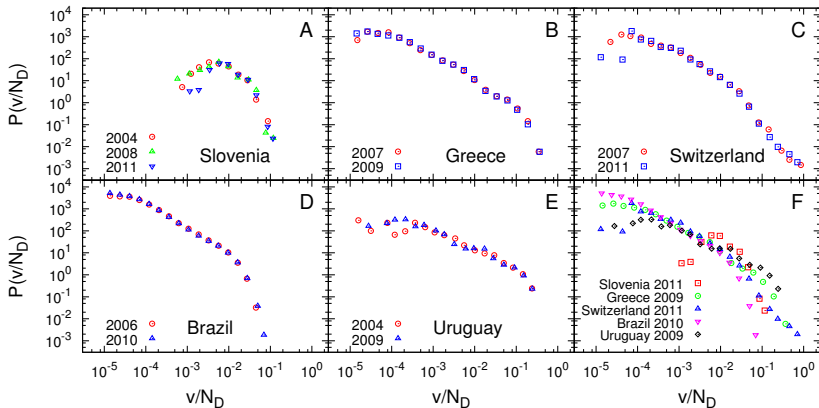
Open lists I: fraction of votes

$P(v/N_D)$ for 5 countries with the same election rules.



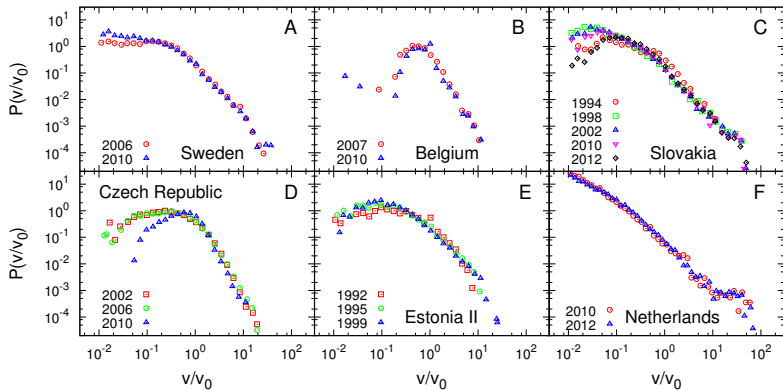
Universality: elections for different years in the same country.

Open lists II: fraction of votes

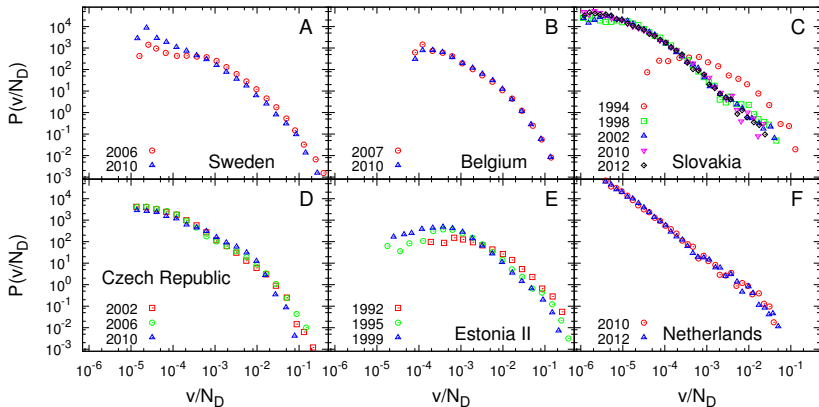


Semi-open lists: candidate performance

Universal curve for each country.



Semi-open lists: fraction of votes



Summary

- Universal signature for different countries only emerges when one considers distribution of candidate performance - $P(v/v_0)$.
- Nations with the same rules have the same voting patterns.

Thank you for your attention!